BRIEFING
TECHNICAL PAPER
OFFICE OF SUPERFUND REMEDIATION AND TECHNOLOGY INNOVATION
EPA, REGION 4

Florida Phosphate Mine Initiative
Region 4, Superfund Division

February 28, 2008

U.S. Environmental Protection Agency

PURPOSE

- Proposed strategy for assessing phosphate mine related CERCLIS sites
- Review Region 4's criteria for addressing TENORM at phosphate mining sites
- Summarize coordination efforts among EPA HQ, ASTDR, FDEP, and FDOH

OUTLINE

1.0 Purpose of Technical Paper
2.0 Phosphate Mining in Florida
3.0 Potentially Affected Area
  3.1 Exposure Pathways
  3.2 Potentially Affected Population
4.0 Authorities to Address Phosphate Mining and Contamination Associated with Phosphate Mining
  4.1 Federal Authorities
  4.2 State Authorities
  4.3 Local Authorities
5.0 History of Federal and State Actions and Coordination
6.0 Assessment and Evaluation Criteria
7.0 Proposed TENORM Assessment Strategy

POTENTIALLY AFFECTED AREA

- 23 CERCLIS sites that total approximately 337 square miles in size
- 2 square miles of residential development associated with CERCLIS sites
- Additional developed and undeveloped areas beyond the scope of this project

ASSESSMENT & EVALUATION CRITERIA

- 5 pCi/g above background for Ra^{226} in soil (Source: UMTRCA) (background: 1pCi/g)
- 5 pCi/l for Ra^{226} in groundwater (Source:MCL) (background: < 2 pCi/l)
- 20 µr/hr above background for direct gamma radiation (Source: UMTRCA) (background: 6 µr/hr)

PARTNER AGENCY FEEDBACK ON PHOSPHATE INITIATIVE

- EPA HQ (OSWER, ORA, OECA)
  - Guidance on assessment and cleanup of radiation sites under Superfund
  - Guidance on assessment and cleanup criteria used by other programs
- ATSDR
  - Defined "Observable health effects" versus "potential risk"
  - Advised on protectiveness; does not set cleanup level
  - Observable health effects level based on "minimum risk level"
  - MRL of 100 mRem/yr for radiation corresponds to approximately 10^{-3} risk level
  - Determined EPA criteria protective, but could be higher
  - Concurred with EPA's proposed radiation assessment strategy
- State
  - Provided GIS support in identification and location of phosphate mines
  - Provided insight into phosphate mining industry and role of state in regulating the industry
  - FDOH proposed tiered assessment and cleanup approach based on radiation levels less than 100 mRem/yr, 100 to 500 mRem/yr, and greater than 500 mRem/yr

PROPOSED STRATEGY

- Develop and implement communication strategy in coordination with EPA HQ, ATSDR and State
- Conduct aerial radiation survey of 23 phosphate mine related CERCLIS sites
- Conduct ground-based characterization at individual sites guided by data from aerial survey
- Issue Expanded Site Inspection (ESI) reports and document decisions in CERCLIS
- Evaluate PRP involvement for ESIs at individual sites

SCHEDULE

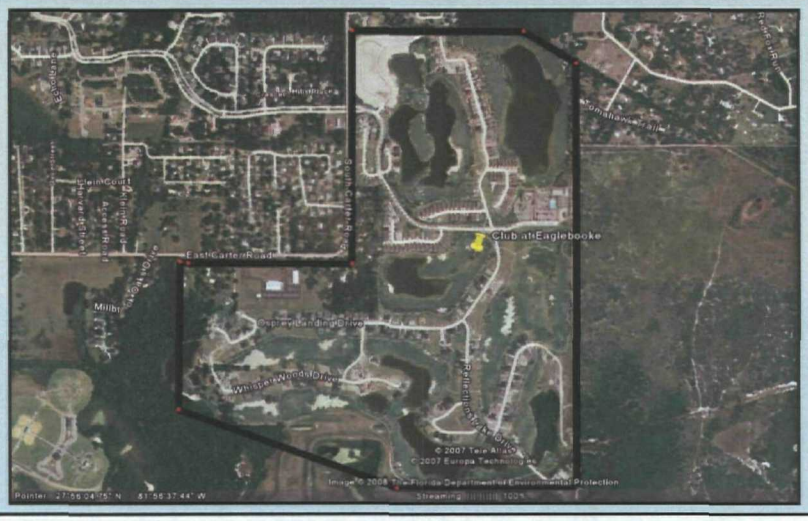
- Survey contractor's draft Work Plan completed (12/07)
- Draft communication strategy completed (12/07)
- EPA Regional Senior Management meeting February 2008
- Office of Superfund Remediation and Technology briefing February 2008
- RA Briefing of Administrator March 2008 (?)
- Governor's staff briefing (?)
- Approve WP and CI strategy March 2008
- Press release issued early-April 2008
- Radiation Survey April through June 2008
- Report September 2008

NEXT STEPS

- Formal project approval needed March 2008, based on current schedule
- Obligate project funding March 2008

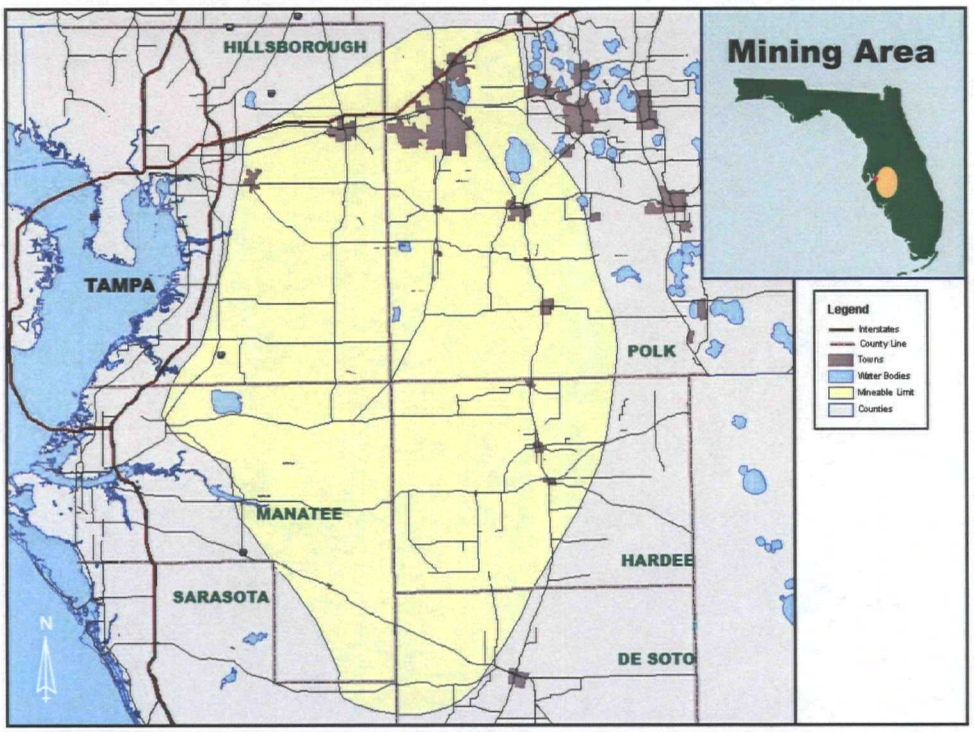
SUPPLEMENTAL INFORMATION

RESIDENTIAL DEVELOPMENT OVERLYING CERCLIS SITE



BACKGROUND

- Phosphate Mining conducted in West-Central Florida since late the 1800's.
- Waste by-products contaminated with elevated levels of Radium and Uranium (TENORM).
- State regulates mine operations and reclamation, but not radionuclides.
- Formerly mined land frequently developed for residential use, potentially increasing annual doses of radiation.
- 21 former mine sites in EPA inventory awaiting further characterization.
- Approximately 7,000 acres of residential areas currently located over former mines.
- EPA and State radiation data indicate potential for increases in cancer ($1x10^{-3}$ to $1x10^{-2}$) due to increase exposure to radiation.


HILLSBOROUGH
TAMPA
POLK
MANATEE
HARDEE
SARASOTA
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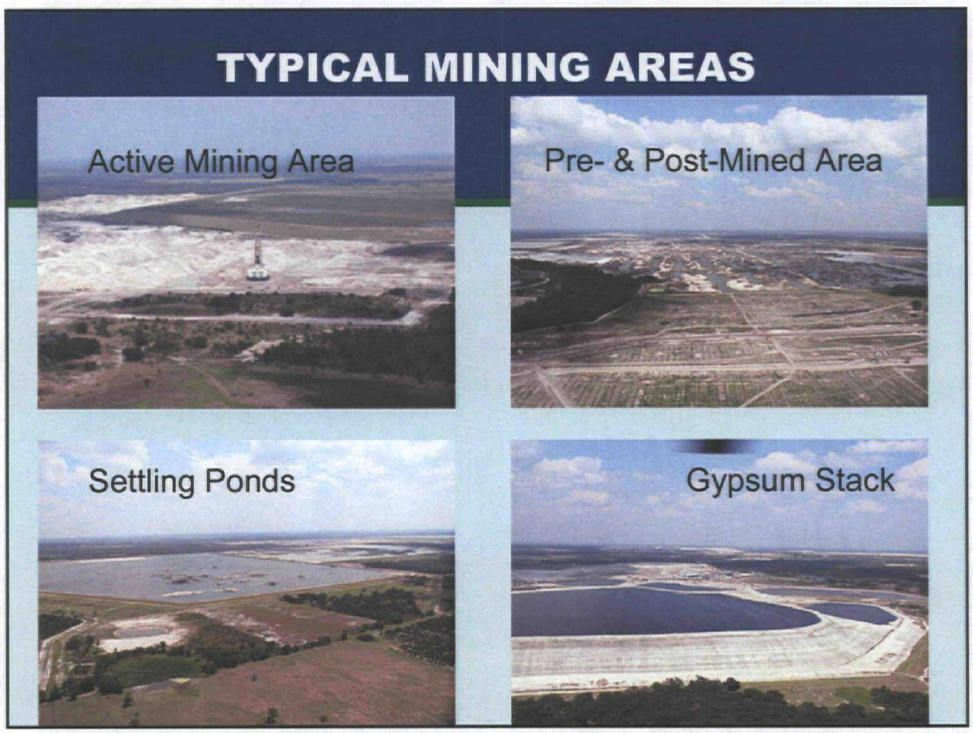
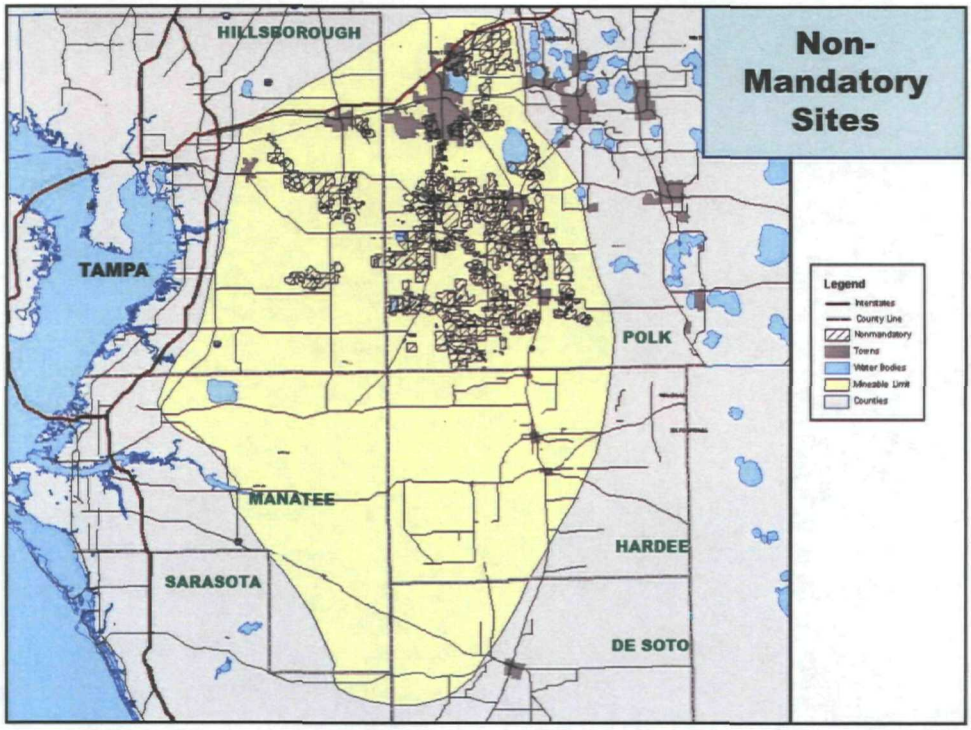
Mining Area
Legend
Interstates
County Line
Towns
Water Bodies
Mineable Limit
Counties


TYPICAL MINING AREAS
Active Mining Area
Pre- & Post-Mined Area
Settling Ponds
Gypsum Stack


Non-Mandatory Sites
HILLSBOROUGH
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SARASOTA
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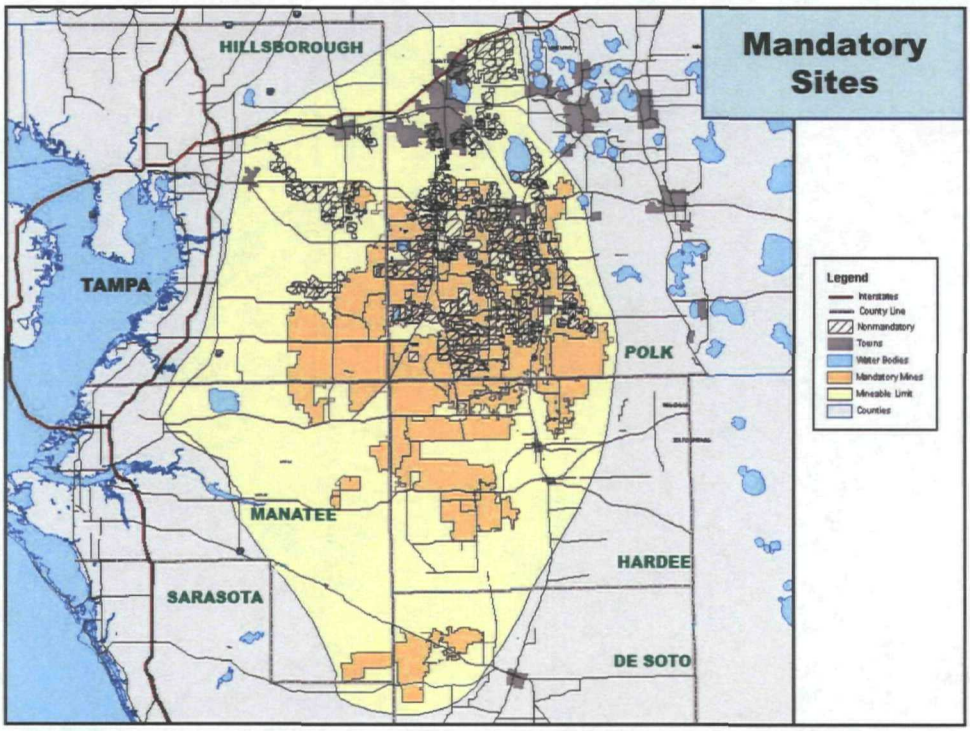
Mandatory Sites
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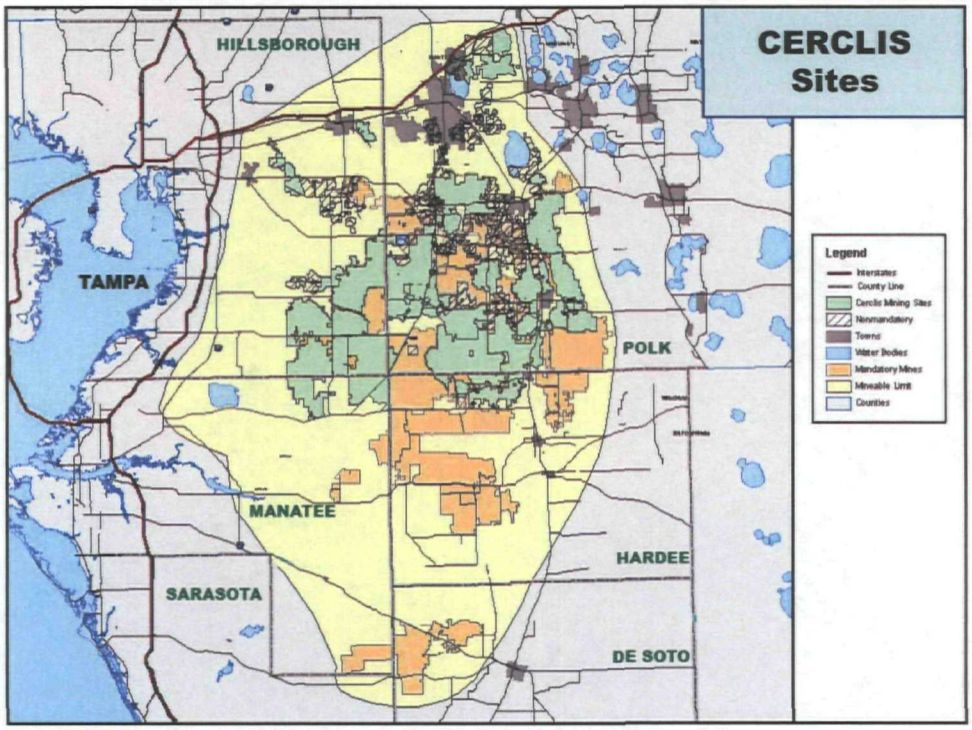
CERCLIS Sites
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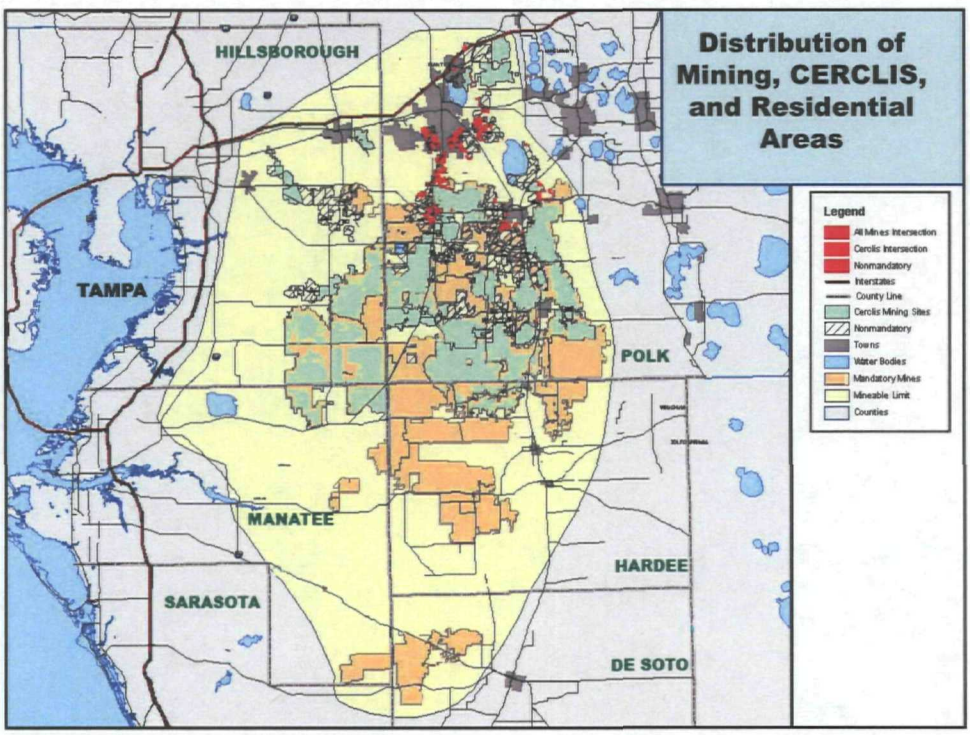
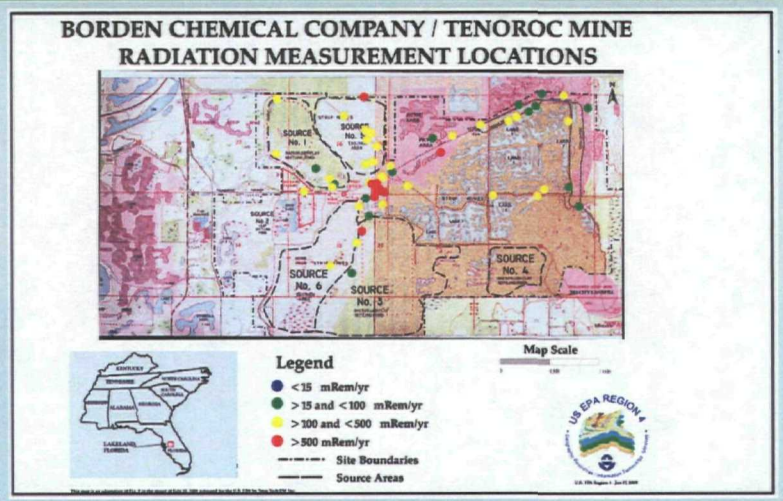
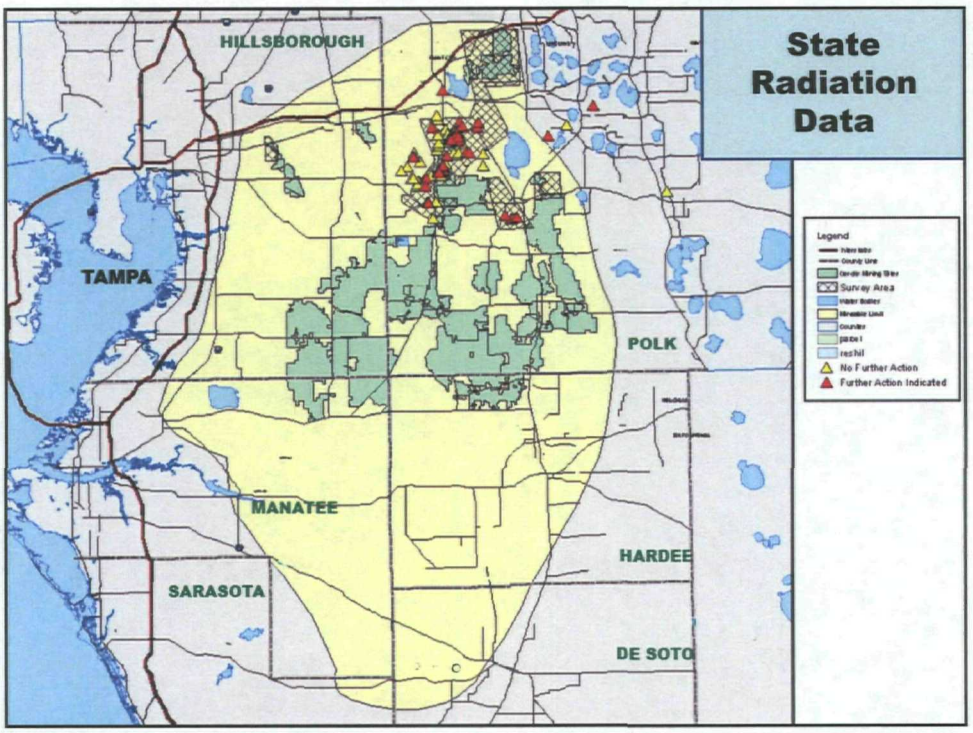
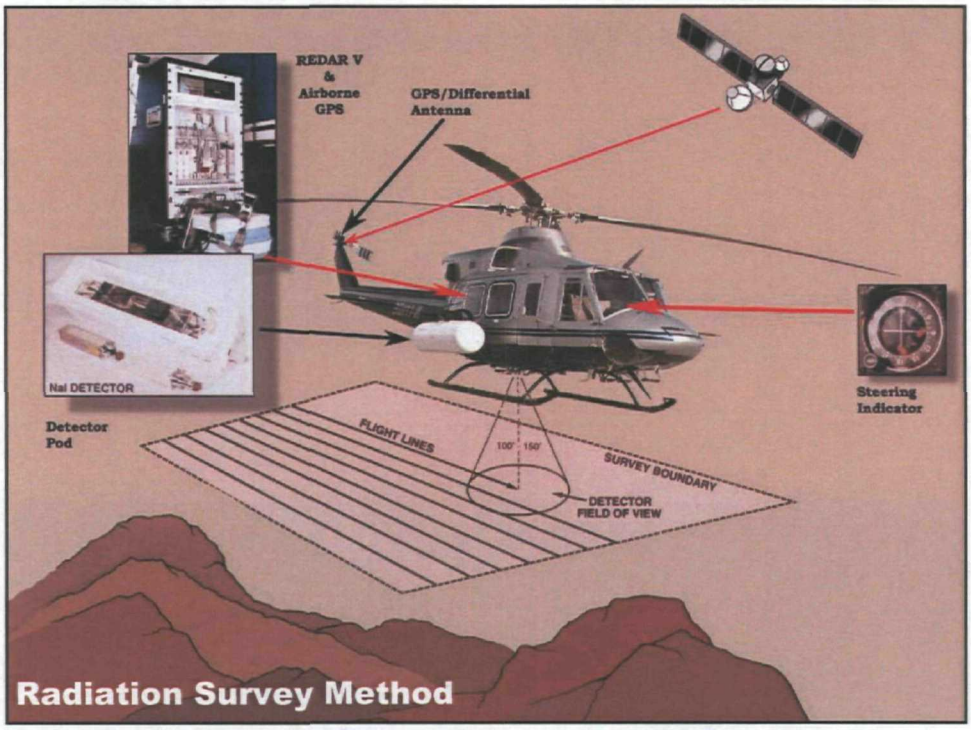

Distribution of Mining, CERCLIS, and Residential Areas
HILLSBOROUGH
TAMPA
POLK
MANATEE
HARDEE
SARASOTA
DE SOTO
Legend
All Mines Intersection
Cercilis Intersection
Nonmandatory
Interstates
County Line
Cercilis Mining Sites
Nonmandatory
Towns
Water Bodies
Mandatory Mines
Mineable Limit
Counties

EPA RADIATION DATA
UNDEVELOPED MINE







CURRENT PHOSPHATE MINING COMPANIES & CURRENT/FORMER OWNERS OF SAMPLING OF CERCLIS SITES AND DEVELOPED AREA

- **CURRENT MINING COMPANIES**
  - CF INDUSTIRES (MID-WESTERN CO-OP
  - MOASIC (FORMERLY CARGILL AND AGRICO)
  - PCS PHOSPHATE (CANADIAN COMPANY)
  - USAC (CHINA BASED COMPANY)
- **CERCLIS SITES CURRENT/PAST OWNERS/OPERATORS**
  - AGRICO; WR GRACE; IMC; CARGILL; AMERICAN CYANIMID; KERR-MCGEE; SEMINOLE FERT.; AMAX; CORONET; BORDEN; FARM LAND IND; ESTECH; SWIFT AGRICULTURAL
- **CHRISTINA BLUFFS RESIDENTIAL AREA**
  - W.R. GRACE ORGINAL OWNER
  - MULTIPLE INDIVIUAL AND BUSINESS OWNERS
  - CURRENTLY OWNED BY INDIVIDUAL RESIDENTS